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PUBLIC WORKS

CITY COUNTY STATE

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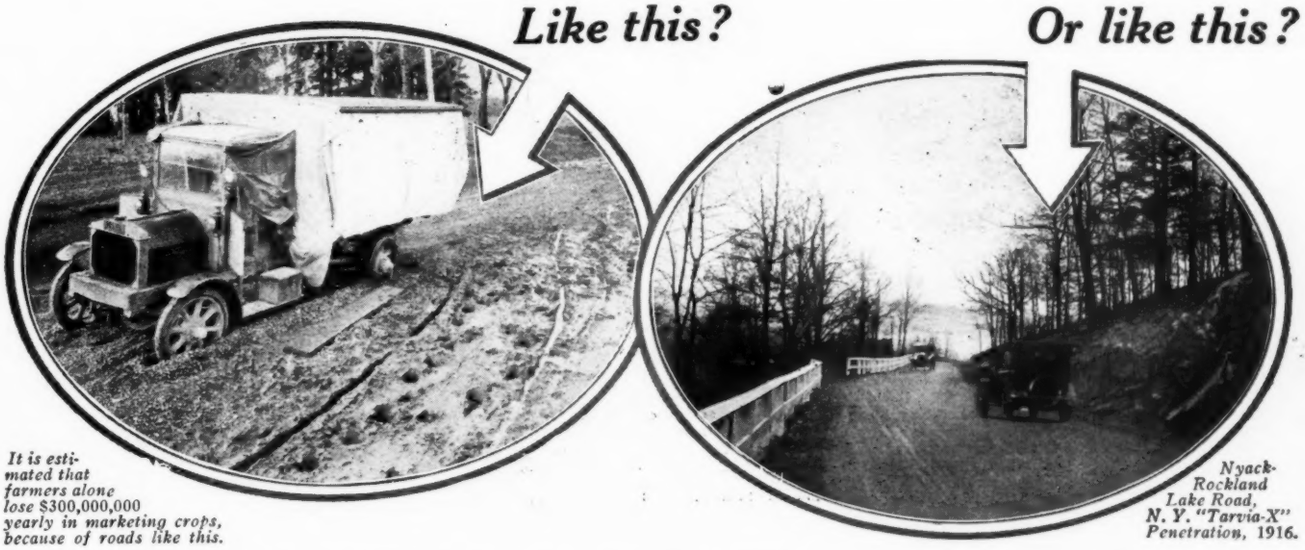

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PUBLIC WORKS.

CITY COUNTY STATE

A Combination of "MUNICIPAL JOURNAL" and "CONTRACTING"

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Substitutes For Sewers

By W. A. Hardenbergh

Most cities have outlying districts not reached by sewers, in many half of the population lives in such districts; and many towns and villages have no sewers. For every such district some public substitute for a sewerage system should be provided. The substitutes in common use are discussed in this article.

A very large proportion of the communicable disease of the average city springs from its unsewered fringe—from that portion of the city lying beyond the sewer limits. The city limits in this case mean nothing. Diseases do not observe any such man-made boundaries. The unsewered area, whether within or without the city limits, is a health problem.

Just what proportion of the disease can be traced to the unsewered area depends very largely upon local conditions, such as the location of the city inside or out of the "typhoid belt," the major diseases prevailing, the unsewered population, etc. Whatever this proportion of disease is, it has been proven many times that the installation of sanitary devices in the unsewered area will practically eliminate typhoid and its allied diseases; it will also reduce very materially other communicable diseases.

The area and population not reached by sewers varies in the different cities, of course. Fayetteville, N. C., until recently reached with sewers but half of its population; Fort Worth, Texas, with a population of 120,000. had one-sixth of these beyond the sewer lines; Montgomery, Ala., Charlotte, N. C., and many other cities have a larger percentage. Brockton, Mass., is practically entirely sewered within the city limits.

It will be seen that most of our cities are confronted with a public health problem of considerable magnitude. The drift to the cities of the past five years, coupled with the factors that during the same period have limited city progress and construction, has intensified the seriousness of the problem. The obvious cure, of course, is to construct sewers, but this cannot always be done. Money may be lacking; geographical or other difficulties, due to an unexpected growth of the city, may require an entire new system of sewers. The question then arises as to what substitutes for sewers are available.

Two conditions are found. A cheap substitute may be needed to stop the gap until, within a year or two, sewers may be built. On the other hand, there may be sections where a fairly permanent sewer substitute may be needed.

No attempt will be made here to give data on the subject such that anyone may apply. Every city has a problem of its own, which requires, for best results, special study. An engineer with experience along this line, or a skilled health officer, will be needed to secure greatest returns for money spent.

The methods most generally used may be classified as follows:

Temporary: Pit; box and can.

Semi-Permanent: Concrete vault and modifications; septic closet.

Permanent: Chemical closets; small septic tanks with running water.

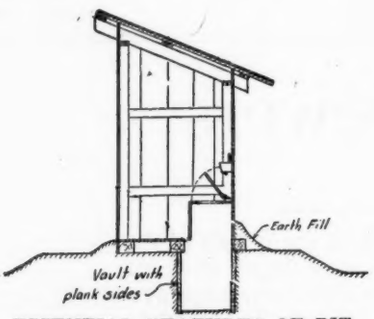
These classifications are not rigid. The second class is called semi-permanent, not because of lack of durability of the structures, but mainly because such installations are rarely satisfactory over a long period. The same is true, though to a much less extent, with the chemical closet. As a matter of fact, however, neither the concrete vault, the septic closet, nor the chemical, is an important factor in city sanitation; their importance is far greater in the rural field.

THE PIT

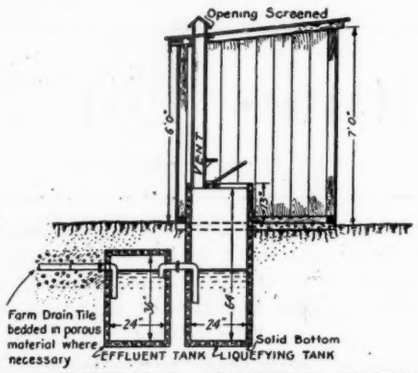
For any community, there is very little to recommend the pit except its low cost. Recent research has shown it to be a dangerous factor in water pollution. Well constructed and carefully maintained, it answers very well the requirements of the rural dweller, but even its enthusiasts can scarcely give it a place in any thickly populated section. It should never be used in any locality where water is obtained from shallow wells.

In those few sections where conditions are such that no other type is possible, and where the

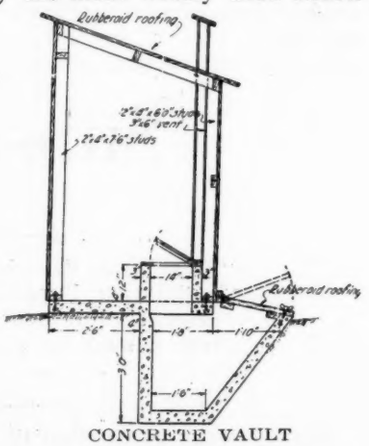
water supply is not from the ground, the pit may be used. The pit itself should be from three to four feet in depth—a greater depth loses the beneficial effect of the soil bacteria—and about three feet square. The pit should be sheeted, when necessary to prevent caving, and should always be curbed and banked to turn surface water. A good seat and lid and good screening to prevent the entrance of flies, as well as a good house, are necessary.



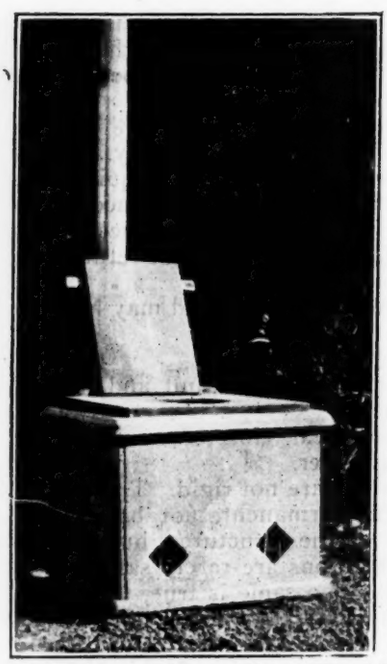
ESSENTIAL FEATURES OF PIT PRIVY



A COMMERCIAL CONCRETE SEPTIC CLOSET



CONCRETE VAULT



CEMENT BOX FOR CAN, ASSEMBLED READY FOR USE

The first cost of the pit is about $5 to $7. The house, screens and vents will cost from $15 to $20. A new pit is necessary every year. This puts the first cost at from $20 to $25, and the yearly cost at about $6.

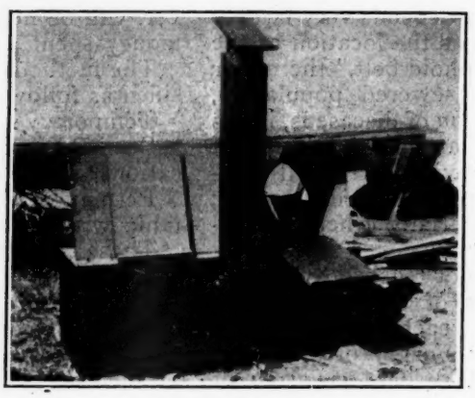
It will be seen that within a few years in any thickly settled neighborhood the soil will receive a very heavy load of pollution. How long this matter will retain its dangerous properties is not known, but it has been amply demonstrated that such pollution is very dangerous to the ground water. Experiments by the Rockefeller Foundation in Georgia, and by Dr. Nesbit, near Wilmington, N. C., have shown that these dangers are real. Last year an experimental board of the Public Health Service traced fecal coli 160 feet from privy pits through ground water in a sandy soil. Even though nothing has been proved as to the ultimate length of travel, nor the time that such pollution remains dangerous, enough has been shown to indicate the danger of using the pit privy in regions where pollution of the ground water would be dangerous.

THE BOX AND CAN

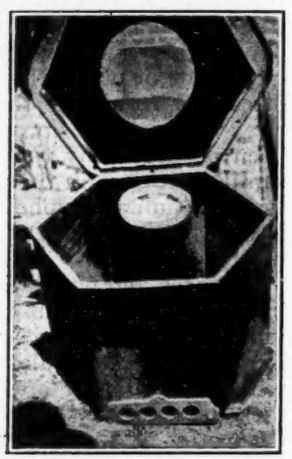
This is probably the most widely used substitute for sewers. Though actually capable of a high degree of sanitation when properly installed and used, the average installation returns little sanitation for the money expended, and usually tends to hasten the advent of sewers through the disgusting fashion in which it is operated.

The box and can system is low in first cost, but rather high in operating cost, so that it is especially fitted for a temporary installation. Collection, disposal, can upkeep, etc., should be under municipal direction. Primarily, the system is merely a water-tight can placed under a fly-tight, ventilated box. At regular intervals the pail is emptied and cleaned, or removed, and a clean pail placed in its stead. This requires the operation of a scavenger service.

An intensive study has been made and many improvements initiated in the construction fea-



DOUBLE WOODEN BOX FOR CANS, BEFORE INSTALLING IN HOUSE, AT ABBOTT, TEXAS



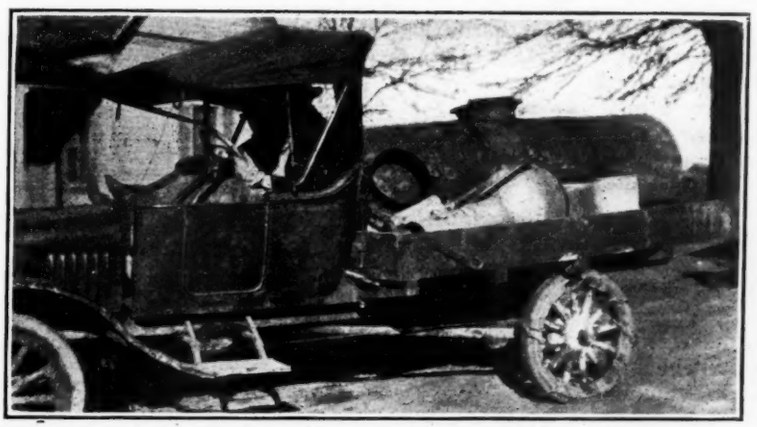
CAST IRON BOX FOR CAN

Seat raised to lift can out. Screens at bottom front and top rear. Front plate removable for repairing screen by unscrewing three small bolts, and rear plate by unscrewing two.

tures of this type, chief among them being the plan of Dr. L. L. Lumsden, first used at Jasper, Ala., of building the boxes separately and in quantity and installing them later in old or rebuilt buildings. The chief need now is for study and improvement in management, rather than in construction. Substantially no progress has been made in attaining a maximum of sanitation after the installation has been completed.

Of late years, the tendency has been to build single boxes about 20 inches square and 18 inches deep, with a hinged or loose cover to allow the removal of the pail. Metal and even concrete boxes have been used. They are usually better than the wooden box, but the cost is greater.

A questionnaire sent out about a year ago brought returns from about 20 cities operating pail systems of considerable size. The average cost of nine recent installations was about $9 each, for wooden boxes. Commercial metal and concrete boxes cost from $12 to $15, including the can. The cost of $9 included installation in the outhouses. Any installation exceeding in size eight hundred or a thousand boxes can be installed for from $8 to $10 each.



TANK WAGON ON COLLECTION ROUTE
In use in Talladega, Ala., for scavenging can system

Pails before the war commonly lasted 2 to 3 years, but the above questionnaire indicated an average life of only 14 months. This may be increased by coating the pail with asphaltum, or by lining with a newspaper. The present cost of pails is from $1.25 to $2.50 each, according to weight of metal. Scavenging now costs about $7 per can per year, though many cities are now charging only $6 per year. Five years is about the life of an average system, so that we have an initial cost, using the old outhouse, of about $10, and a yearly charge of about $9 per can per year, plus a complete new start every five years.

Every box and can system installed has shown a very material reduction in disease, even though it is poorly built and carelessly installed. It has been only lately that the use of copper screening, durable construction, and efficient operation have been particularly stressed. Nevertheless even the shoddy jobs have yielded immense returns in sanitation.

Disposal means will be necessary, and in the average city dumping into the sewers is the best solution. Where this cannot be done, burial, incineration, or tank treatment may be adopted. Collection may be by contract or by city forces. The latter is usually the best.

The advantages of the box and can system are cheapness, simplicity, flexibility, ease and rapidity of installation, and complete community control. The disadvantages are its temporary character, and the ease with which it retrogrades to a condition no better than that which it was designed to remedy.

THE CONCRETE VAULT

This was developed about the beginning of 1917. It was built in large numbers around many of the cantonments, and in several cities. On the whole, it has not been much of a success in city sanitation. In addition to having most of the defects of the box and can, it has several important ones of its own.

TANK WAGON DISCHARGING INTO SEWER MANHOLE THROUGH FUNNEL
On one of principal streets of Talladega, Ala.; no odor or complaints.

As generally constructed, this consists of a concrete box cast in place in the ground, the rear wall sloping to allow for better cleaning, and a partition dividing the box into two compartments of about 75 to 100 gallons each. It was planned to use one compartment; to allow this to cure or dry, while the other was being filled. Drying seems to be the opposite of the actual tendency which appears to be liquefaction. Leakage and overflow aid this latter tendency and generally prevent its operation as planned. There is also the practice quite general in some cities to empty garbage and

CONCRETE VAULT TYPE
Cast outside; to be lowered into the ground.

DATA ON SOME BOX AND CAN INSTALLATIONS

City	No. Cans	Scavenging		Cost Per Month	Installation Cost	Method of Disposal
		How Often	By Whom			
Charlotte, N. C.	1,900	Weekly	By contractor	$3.60	$18.00	Into sewer
Greenville, S. C.	1,100	Weekly	By city	3.00		Into sewer
Chattanooga, Tenn.	6,000	Weekly	By contractor	6.00	5.00	Into sewer
Montgomery, Ala.	5,700	Weekly	By city	6.00		Into sewer
Huntsville, Ala.	1,400	Weekly	By city		10.00	Into sewer
Columbus, Ga.	3,500	Weekly	By city	9.00	7.50	Into sewer
Petersburg, Va.	1,890	Bi-Weekly	By contractor	12.00		Into river
Richmond, Va.	3,000	Monthly	By contractor	4.80	15.00	Into sewers
Alexandria, Va.	1,800	Weekly	By contractor	13.00		Into sewers
Fort Worth, Texas	4,200	Weekly	By contractor	9.00		Into sewers
Hampton, Va.	490	Weekly	By city	12.00	6.00	Into tank
Phoebus, Va.	560	Weekly	By city	12.00	6.00	Into tank
Newport News, Va.	1,880	Weekly	By city	6.00	6.00	Into sewer

dishwater into the vaults. In consequence, it fills rapidly, gives off odor, and cleaning is very disagreeable.

The cost of the concrete vault, exclusive of the house, is about $35 to $40, when built in large numbers. The scavenging must be performed about twice a year (if both compartments are cleaned at one time). To date the scavenging problem has not been solved. An article in this magazine some time ago described experiments with the use of Seco pumping machine for scavenging. This may work in large installations, but would be too costly for ordinary use. Hand scavenging, too, is costly, far from sanitary, and very disagreeable. It is not too much to say that whatever sanitary qualities the concrete vault possesses are lost in the process of cleaning.

This cleaning has become a problem of great acuteness in the cities where this type was built during the war and has been intensified by the lack of foresight, during construction, in locating the vaults in back gardens and other inaccessible places. In general, the prevailing mode of cleaning is to have a negro bail them out with a bucket and empty the contents into a barrel or other receptacle.

Some extracts from a report on an installation of this type in and around Petersburg, Va., will give an idea of the sanitary value of the installation. One hundred homes were visited. Forty-three seat covers were loose; 46 vaults were filled or overflowing; the contents of 59 were liquid or nearly so; fly larvae were present in 54. Most of these had been in use for less than a year, and the result would indicate a rather rapid disappearance of sanitary qualities.

(To be continued)

Bifurcated Concrete Road

It is said that the main state highway between Schenectady and Albany, New York, carries heavier traffic than any other road in the state except for short distances outside of Buffalo and New York City. During twelve hours of an average day in summer 3,735 vehicles of all types passed over the road. About four and one-half miles of this road still remain as bituminous macadam, and it is proposed to start as soon as weather conditions permit on improving a considerable part of this.

The improved roadway will be 24 feet wide and will consist of two strips of concrete, each 9 feet wide, separated by a 6-foot strip of bituminous macadam. The idea, as explained by L. C. Schermerhorn, division engineer of the district, is that heavy trucks will naturally take the concrete tracks along the outside of the road, while the lighter and faster vehicles will use the bituminous macadam central strip for passing them. Another advantage is that only one-third of the roadway will be torn up for construction at a time, leaving the other two-thirds open for traffic. It is estimated that this construction will cost $55,000 to $60,000 a mile.

Water Filtration

Although chlorine, ozone and the violet ray are very effective as sterilizing agents, they only supplement filtration, which last by itself is reliably effective for purification.

Under the title "Filtration As an Independent Means of Water Purification," F. B. Leopold, vice-president of the Pittsburgh Filter & Engineering Company, read a paper before the Associated Manufacturers of Water Purification Apparatus in which he spoke strongly of the necessity for filtering water, no matter what other treatment was given to it.

He briefly traced the history of filtration from the first English filter built about 1830 and the first American slow filter built in Poughkeepsie in 1872, followed by the introduction of rapid filtration in Summerville in 1887 and the development of this type of filter to such an extent that there were on January 1, 1920, 950 filtration plants in the United States, there then being something over 30 slow sand filters. He stated that during the last ten years only one or two slow sand filters had been constructed.

The first filtration plant to guarantee bacterial removal was that installed at Lorain, Ohio, in 1897, where a removal of 97 per cent of the bacteria was guaranteed. The efficiency of filter plants has increased so that they can now be depended upon for the removal of from 99 per cent to 99½ per cent and the usual guarantee called for by municipal filtration plants is 98 per cent.

Reviewing briefly the development of methods of destroying bacteria by copper sulphate, hypo-

chlorite and liquid chlorine, he stated that the last, which was first used about 1911 or 1912, seems at present to be the most practical, cheap and efficient sterilizing agent. Ozone has high efficiency and none of the objectionable features of copper sulphate and hypochlorite, but the high cost of the process and inability to effect mixing with the water have prevented its successful use. The violet ray has been used in several small plants in Europe and this country but while effective it is very expensive both to install and to maintain.

He stated that the possibilities of destroying bacteria by sterilizing agents had tended to create in the minds of many people the idea that filtration was not needed where such agents were employed, and that certain manufacturers of apparatus and dealers in such agents had helped to create this belief. This, he thought, was very unfortunate, because of its possible effect upon public health. A filtration plant without any other assistance removes 98 per cent to 99 per cent of the bacteria in the water and even with the most careless operation the percentage will seldom go below 95. Except by absolutely malicious intention the water must all pass through the filter plant and even with unskilful operation the result will be a very high percentage of removal of all harmful matter. But if only sterilization is relied upon, and the apparatus gets out of order, the entire protection is automatically removed; the percentage of purification is not reduced but the purification is entirely eliminated. Moreover, in order to obtain the highest efficiency from any sterilizing agent, it is essential that foreign suspended matter be eliminated from the water, for the efficiency varies with the amount of suspended matter in the water. Comparatively few plants have duplicate sterilizing apparatus, so that should the one in service get out of order the consumers are left entirely unprotected from any pathogenic bacteria in the water.

Mr. Leopold recognized the importance of sterilizing water after it had been filtered as an additional protection which was well worth its cost, but asserted most vigorously that it should be considered not as an independent means of making water safe but as supplementary to filtration, which latter should be considered as the chief and most reliable defense of the community.

Itinerant Concrete Mixing Plants

Mixer, aggregate and cement carried on a large truck, and concrete for small jobs, distant from the source of supply, mixed on the spot.

The New York Telephone Co. recently constructed a wire conduit or duct subway in the road between Union and Passaic, N. J., which involved the problem of finding a place or method for mixing the concrete. The road was narrow and was lined with swamps on both sides, so that concrete could not be mixed in the roadway and to have mixed it off the roadway would have required platforms in the swamps for both mixer and aggregate at intervals of about 500 feet.

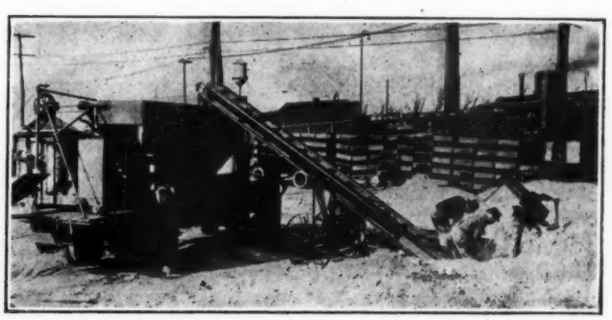
This was a 12-duct subway 6½ miles long, constructed of multiple duct tile with concrete foundation and concrete top protection and with all manholes built entirely of concrete.

To meet this condition the company used a concrete mixing plant mounted on an automobile truck. This was a power batch mixer carried by a seven-ton Packard truck which was also equipped with two gravity hoppers, one for sand and the other for stone, and a tank for water. The aggregate was deposited at points convenient to the job and loaded, the sand into one hopper and the stone into the other by a Portable Machinery Co. scoop conveyor, while the bags of cement require for the batch were taken on at the cement shed. The material thus loaded on the truck was sufficient for five yards of concrete. The mixer was fed by a laborer who shoveled the sand and stone into the mixer from openings at the bottom of the gravity hoppers. Another man added the cement and operated the mixer.

Arrived at the trench, the truck was drawn alongside and a spout set so that the concrete could be delivered directly into position. After a little practice the truck driver found it possible to so regulate forward movement of the truck as to give the required thickness of the concrete in the trench so that little hand-spreading was necessary.

The same company, in building a 24-duct subway between Jersey City and Newark, employed the same portable mixer although there was room

DISCHARGING CONCRETE INTO CONDUIT TRENCH



LOADING AGGREGATE ON AN ITINERANT MIXER

along the roadway for using the regulation mixer, and it is reported that the automobile mixer effected a saving of 25 per cent over the use of mixing stations and dumping the concrete into the trench by wheelbarrows.

Such itinerant concrete plants are used also for doing small concrete construction or repair jobs in different parts of a given locality. Such a plant has been found convenient and satisfactory by B. S. Edward, contracting engineer, of Jersey City, who has equipped a 6½-ton Packard truck with a 4½-ton stone storage bin, a 2½-yard sand bin, a 280-gallon water tank, and storage for 25 bags of cement, enough of all for about 5 yards of mixed concrete.

On the rear of the truck there is installed a ⅓-yard "Knickerbocker" gasoline-driven mixer with an elevating loader and a steel chute for spouting the concrete to position.

This outfit eliminates a large portion of handwork and greatly expedites scattered small jobs, such as setting manhole heads, small conduits, curb, gutter and sidewalk jobs; eliminates the separate delivery of sand, gravel, stone and cement; and concentrates all of the factors for the work so that the jobs need not wait on any single missing link. With this equipment the cellar walls and foundations for a house are completed in one day by the truck and its seven-man gang.

Bituminous Filled Brick Pavement with Lugless Brick

By C. R. Livingston*

Difficulties encountered and devices tried for overcoming them in the effort to secure uniform joint spacing between lugless brick and to maintain it during rolling. Work done last year in Scott County, Iowa.

During the construction season of 1920 the only brick road construction done in the state of Iowa on any of Iowa's primary road system, and the only brick road construction receiving any part of Iowa's allotment of Federal aid funds, was the work done on Federal Aid Project 114 in Scott county. This project is divided into three sections, covering three of the most important roads leading out of Davenport, the county seat of Scott county. The total length of the three sections is 17.28 miles. Owing to the lack of materials and the car shortage of the past year only a little less than two miles has been completed.

One of the features of this work which has caused no little amount of grief to the contractor as well as the engineers in charge of the work is the fact that lugless brick have been used in all of the construction to date and about two million brick of the same type are stored along the roadside for use in finishing about six miles more of the project. The road is of bituminous filled brick construction and is being built under the Iowa standard specifications for Federal Aid road construction in which is a clause which reads as follows: "If lugless brick are used extreme care must be exercised in laying the brick to secure spacing equivalent to the spacing that would be secured if lug brick were used. If deemed advisable, the engineer may require the use of a suitable spacing device between courses to insure uniform and adequate spacing." Our trouble with lugless brick starts the moment we try to follow out the provisions of the above clause, and in spite of the fact that that clause is the source of most of our trouble, I feel confident that our specifications would be very sadly lacking if it were not included. We are not trying to follow the above provisions simply because they are a part of our specifications, but because there is much to be gained by doing so.

Before bricklaying operations started on any of these sections, this clause in the specifications was brought to the attention of the contractors and it was their universal opinion that the natural irregularities in the brick would furnish all the spacing that was necessary to admit the bituminous filler. The first day's work was carried on without much being said in regard to spacing and it was evident to most of us that the spacing was too close to give any reasonabl assurance that the joints would be filled. As high as 30 per cent of the brick would be in the doubtful class. Many of the brick would have no visible spacing at all. As soon as this condition of spacing was seen to occur so consistently, the inspectors on the job began to demand that the brick setters pay more attention to spacing the brick, but the results obtained in this manner were not at all satisfactory because the spaces lacked uniformity and some of the brick would still be too close together to admit any filler and other spaces would be as much as a half-inch in width.

Recognizing that it was impossible for the brick setters to obtain any degree of uniformity in the spacing, we placed one man behind the brick setters with a common garden hoe which had been straightened out so that the blade was parallel with the handle, to even up the spacing which had been left by the brick setters by pushing the blade of the hoe into each joint that was too close and thus rearrange the brick on the sand-cement cushion until the spacing was fairly uniform.

With this scheme we thought we had solved the problem of getting sufficient spacing with a lugless brick, but the scheme takes continued and close inspection in order to get a satisfactory job. The problems which arise in the use of this system are more closely akin to psychology than they are to road construction. When the system

* Engineer of Scott County, Iowa.

was first tried out, the contractor brought one of his best workmen back behind the brick setters and explained to him what was wanted and the workman started in a systematic manner to open up the spaces between the close brick and if he saw a brick that he thought should be moved ahead he would put his foot on the brick next to the one to be moved and force the brick ahead by pushing the hoe between the two bricks while his foot held the rear brick to avoid a disturbance of the spacing to the rear which he had already arranged. Within an hour or two he began to slight his work. The first part of the formerly successful operation to be dropped was the holding of the spaced brick with his foot while the bricks ahead were being rearranged. The hoe would still be pushed in between the close bricks, but the open space behind was just as likely to close up as the brick to be pushed ahead. Then a second man with a hoe was put on to assist in the spacing, but it seems that any ordinary workman, after working for about a day at such work, looses his interest in the work and ceases to produce the desired results. The men on the spacing operation were continually being changed in the hope that someone would be found who would put some thought into the work and not lose interest after the first day or so. It was quite common to see a man, after he had been on this work for a day or two, stand in the middle of the street and reach out to the end of the row of brick with the hoe and push the hoe between the end bricks and pull the hoe toward him with a jerk and then reach over to the other end of the row of brick and repeat the operation. The results obtained in that way were just as bad as if the brick had been left as the brick setter placed them, for such procedure was just as likely to close up some spaces that were all right as it was to open up a space that was insufficient.

This haphazard method of spacing continued to the point where the contractor was required to provide mechanical spacers in the form of 1½-inch angles made out of 16 or 18-gauge metal. These angle irons were placed over the edge of the last row of brick set and the next row of brick placed against the angle iron. This way only one row of brick could be set at one time, but by using spacers only one-half or one-third as long as the width of the street either two or three brick setters could work at one time. There is no question but that brick set in this manner could be properly spaced, but there is a little additional cost to the contractor on the item of labor. The season closed two days after the contractor started to use these mechanical spacers and as a result it is hard to tell just how much his output would be reduced by having to use this device. The average number of lineal feet of brick laid in the last four full days preceding the use of the spacer was 409. The number of lineal feet laid the first day the spacer was in use was 340, and the number of feet laid the second day the spacer was in use was 365. This shows that the organization was adapting itself to the new device and I think that in all probability the spacer could be used with but very little more cost than that of the methods previously explained after the men became accustomed to its use.

There are two problems to work out in connection with laying bituminous filled brick pavement with lugless brick. One of the problems is to get the correct and uniform spacing in order to properly admit the filler, and the other, of equal importance, is to keep the displacement of the brick by the roller down to the minimum. The first trip over the brick with the roller is naturally the one which is most likely to cause displacement and as a result has to be done very carefully. After the brick are partially bedded in the sand-cement cushion they can be rolled without further shifting if the roller man uses judgment in handling the roller. The rolling should all be done parallel to the center line of the pavement to avoid any turning on the brick that are only partially bedded. The roller should start at the outside of the pavement and run parallel to the curb line as far ahead as the brick are ready to roll and then pass back over the same path until the roller is back onto the brick that have been thoroughly rolled before any attempt is made to turn the roller.

After the roller has made one trip up the edge of the pavement and back again in the same track, it should make the next trip in such a manner that the roller will lap over the first path half way to secure a uniform surface. After this rolling has proceeded to the center line of the pavement, the rolling should start on the other side of the street and proceed to the center of the pavement as before. This lapping of the roller is expected to give the uniformity of surface that was formerly obtained by the diagonal rolling, but it does not necessitate turning on the brick nor cause the brick to shift under the roller. When the full width of the street is rolled in the above described manner, the paving has had the equivalent of four rollings and the brick should now be thoroughly culled. After the culling is done, the roller should pass over every part of the pavement at least once to bed the new brick in place and to avoid having some of them stick up above the surface so far as to cause the pavement to be rough.

Any turning on brick that are not firmly bedded will cause them to twist under the guide roller when it is turned and cause an uneven spacing. This disturbance is not so noticeable when the turning is done on the brick that have been rolled several times. Another thing that will cause the brick to slide on the sand-cement cushion is reversing the roller too suddenly. The roller should be started and stopped as slowly as possible. People sometimes argue that the small roller should pass over the brick first during the first rolling, but since it is not the vertical component of the force that disturbs the brick, but rather the horizontal component, it is best to allow the large roller to pass over the brick first because there is less of the horizontal component of the rolling force from the large roller when it passes over a brick.

More attention should be paid to the sand-ce-

ment bed upon which the brick are laid when a lugless brick is used than if a lug brick is used. The firmer the sand-cement bed is before the bricks are placed, the less likely the brick are to move. Since the lug brick have lateral support to resist the action of the roller to a greater degree than the lugless brick, more care must be taken with the latter to offset this disadvantage as far as possible. The greatest firmness is obtained in the sand-cement bed when the sand contains only as much moisture as is contained in an ordinary stock pile of sand after a week of warm, drying weather. Fine sand that is absolutely dry as a kiln-dried sand will shift under the weight of the roller and cause each brick to rock slightly, while a sand that contains any appreciable amount of moisture will work up between the brick when the brick are rolled. If the stock pile of sand is exposed during heavy rains it will require several days of favorable drying weather before the sand can be used in the sand-cement cushion without some trouble from the sand coming up between the brick. If the rolling is carefully done and the sand not too wet, the sand-cement cushion should not come up between the brick more than ¼ inch. The contractor who expects to resume bricklaying operations soon after a rain should protect a three or four days' supply of sand from the weather.

The next operation in the construction of the bituminous filled road is the application of the filler. All of the precautions taken so far in the construction have been for the purpose of making sure that the filler would be able to penetrate to the bottom of the space between the bricks. For this reason great care must still be exercised in pouring the filler. The filler should be heated as hot as it can be heated and not injure it, so that it will run into the spaces between the brick better. On the work in Scott county one of the contractors started pouring filler and using rubber squegees, but these had a tendency to cool the filler too much and the filler would in turn stick to the squegee so that the instrument became hard to handle, and did not produce good results. Cast iron squegees were then tried out with much better results, as they could be used hot and kept hot in a fire wagon. To apply the filler successfully a bucket of the hot filler should be poured over an area of the surface of the pavement such that there will be just enough of the filler to about half fill the spaces and the hot squegee should then be run over the top of the brick as hurriedly as possible to get all of the filler into the spaces while it is still in the liquid state. After this application has had time to cool and contract, the operation should be repeated, the second operation being kept a few feet behind the first. Never try to bring the second operation up even with the first except at the end of a day's work. The purpose of this procedure is to avoid dragging any of the filler ahead of the squegee onto the new brick, or rather the brick which have not had the first application. If any filler is pushed ahead of the squegee and out onto the brick which have not had their first application, it will fill just the top of the space and not penetrate to the bottom of the space properly, for the filler pushed ahead of the squegee is naturally much cooler than the filler direct from the bucket and should always be used in the top of a space that is partially filled, which means that it should be used only on brick that have had their first application.

Bituminous filler absolutely will not stick to a damp brick, and about the best test to show whether or not the brick are too damp is made by trying to peal some of the filler off of the brick. If the filler separates from the brick and leaves no trace of filler on the brick when a knife blade is run along the surface of the brick, or if the filler can be made to separate from the brick in any way with the knife, it is an indication that the brick are too wet. If the brick are dry there will always be a thin film of filler adhere to the brick even if it is so thin as to allow the brick to show through.

The above methods of construction grew out of our endeavors to build a first-class pavement with lugless brick and I believe we have succeeded in securing a first-class job. When we were suspicious of the results being obtained by the contractor we confirmed our suspicions by tearing up some of the finished pavement before we asked the contractor to revise his methods. In all cases we have been fortunate in having the co-operation of the contractor, and in laying the remaining fifteen miles of this project next year we expect to learn more of the possibilities of constructing bituminous filled brick pavement with lugless brick. It is my opinion that lugless brick will make a pavement that is entirely satisfactory, but there is going to be a greater cost to the contractor on the item of labor and there must also be more rigid inspection than would be the case with a lug brick.

Columbus to Enlarge Filtration Plant

The city of Columbus, Ohio, expects to let, in a few weeks, a contract for enlarging its water purification works, involving eight new filters, with strainer systems, filter controllers and operating tables, enlarging the enclosing building, 30,000 cubic yards of excavation, 8,743 cubic yards of concrete, 270,000 pounds of steel reinforcement bars, 300 tons of cast iron pipe and special castings, 455 cubic yards of filter gravel and 645 cubic yards of filter sand. C. B. Hoover is engineer in charge and John H. Gregory is consulting engineer.

Pennsylvania Road Work to Begin

The Pennsylvania State Highway Department, during the first week in April, notified those holding contracts for state highway work that they must begin construction work at once. It is expected that work will start two weeks earlier than last year.

When work stopped last fall, 467 miles of durable thoroughfare under contract remained to be completed. Some of the contractors in the southern tier of counties were able to continue rough grading operations during the winter, but this was not possible in the northern sections.

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Before Sewers, What?

Sewers have been laid in less than half the streets of the cities of the United States having more than 30,000 population; and in only a little over one-third of the streets in such cities having under 50,000 population. This statement is derived from the figures of the latest United States census report. (The percentage obtained by dividing miles of sewers in all the cities by miles of streets in such cities is 45.7.) In a number of states the showing for sewerage is very much less favorable.

Sewers are a convenience, but more important is their relation to health. Health records as well as theory show that the death rate is reduced by the introduction of sewers. A city therefore which provides no sewers for three-fourths of its population not only deprives that number of an important convenience but also imperils the lives of them and of the remaining fouth as well. The same applies to smaller cities as well as those of 30,000 and larger.

With the best of intentions and efforts, however, most cities grow on the outskirts more rapidly than the sewers can be extended, and these continually receding areas of unsewered houses are a menace to the city's health.

But the difficulty or delay of providing sewers should not prevent the making of some provision for the health and convenience of the citizens. Temporary substitutes can be adopted without delay that will prove much better than total municipal neglect and will save many lives. Those in use in different communities are described in the first article in this issue.

Improved Highway Specifications

The Iowa Highway Commission's new classification for the excavation of mud is a very commendable improvement in a much-needed recognition of construction costs that will operate to the advantage of the state and of the contractor. It provides compensation for difficulties not foreseen when the contract is awarded, and if made retroactive so as to cover all work on the contract that is executed before the classification is allowed, should be entirely satisfactory to the contractor.

It should, however, be made mandatory rather than optional with the engineer to allow the special classification whenever a fixed minimum quantity of material handled comes under the fixed requirements. Similar provisions might in some cases be advantageously made for the excavation of rock and indurated material, and for material unexpectedly submerged.

Special classifications are not, however, desirable where it is possible to cover the subject thoroughly by detailed specifications and the latter should be particularly complete and thorough in regard to the different kinds and conditions, and sometimes amounts of various kinds of excavation and of concrete, the latter being clearly defined and limited in the text and unmistakably noted on the drawings and conventionally distinguished there besides.

Reducing Construction Wages

A symposium of opinions of prominent contractors from all parts of the country on the subject of wages, published in this issue, shows enough diversity of opinion to throw light on all sides of the subject. But it is surprising that, in the discussion by experts of a vital subject that dominates their present and future interests, they should have omitted two of the most important essentials, namely that the wages should to the utmost possible extent conform absolutely to efficiency, no matter how high or how low it may bring them, and that those in the engineering field should bear a just proportion to those in other industrial pursuits, including shop and factory in which the downward trend is already well advanced, as well as in other forms of labor, especially in trained and responsible positions of brain workers that are excessively underpaid.

The contractors also neglected to recognize the very pertinent fact that during and since the war labor has been most conspicuously a favored class and by reason of its general practical exemption from direct taxation of any form and by the mad

pace with which politicians scrambled to raise wages much faster than the cost of living, labor has been exempted from the war and industrial burdens of the country and has been encouraged in arrogance, extravagance and inefficiency. The day of exorbitant war profits is past and labor and other profiteers must rapidly return to giving a fair equivalent for money received.

Road Materials Storage Plant for Bergen County, N. J.

Bergen county, N. J., has about 160 miles of roads paved with various types of bituminous construction. It also has about 67 miles of roads which are surface treated with bituminous materials, and the annual consumption of bituminous materials of all kinds on new construction and surface treatment and repairs is about 1,500,000 gallons. The Board of Chosen Freeholders and the supervisor have decided that a complete road materials storage plant, providing adequate storage facilities for bituminous materials required for road construction and for surface-treating, is in accord with good business policy and will prevent delays incident to the difficulty of obtaining prompt shipments during the busy season. If at any time the supply on hand is in excess of the county's requirements, the authorities contemplate furnishing material to municipalities or to contractors working upon their roads.

The plant is to be located in County Yard No. 2 at Hackensack, N. J. This yard is situated on the Erie Railroad and the county authorities have constructed a railroad siding on the property. Bids for the plant will be received in a few weeks. (See advertisement in this issue.) Plans and specifications for the plant, which is to be a model of its kind, have been drawn by Dow & Smith, consulting engineers of New York City.

The plans call for four 50,000-gallon storage tanks and two 4,000-gallon heating tanks, a boiler and boiler house, two 10,000-gallon fuel oil tanks, two pump houses, each containing a rotating plunger pump; also a cement storage warehouse.

A railroad siding runs along the easterly side of the plant, which is arranged with the tanks and warehouse in a row extending approximately north and south. The rails are two feet below the platform surrounding the tanks and the boiler house floor, and 4 feet 3 inches below the storage warehouse floor. Along the west side of the plant runs a roadway six feet lower than the railroad siding, or 10 feet 3 inches below the level of the storage warehouse floor. A retaining wall is to be constructed along the east side of the roadway.

The plant occupies a space 284 feet long and 50 feet wide, and this space is as compltely occupied by the tanks and buildings as is possible without overcrowding. Fourteen feet of the width is occupied by the track; the roadway borders the property on the west.

Each of the four storage tanks is 21 feet in diameter and 21 feet high and has a capacity of 1,000 50-gallon barrels. They are insulated by means of 6-inch hollow tile walls built around them, and are provided with sufficient steam coils to keep the material in a fluid condition. Each tank is surrounded by a dam wall two feet high to take care of any overflow or boiling over of the material.

A heating tank is located between storage tanks Nos. 1 and 2, and another between Nos. 3 and 4. These tanks are insulated with magnesia blocks and are provided with a steam coil installation relatively larger than that of the storage tanks, so that in them the bituminous materials can be heated to the temperature required for application on the road. These tanks are 8 feet 2 inches in diameter and 15 feet long, resting on their sides in pillow blocks. These tanks will be filled by gravity from the storage tanks except when the material in the latter is at a very low level.

In each of the same two spaces between the pairs of tanks (which is 45 feet 8 inches center to center) is located a pump and pump house. The bituminous material and fuel oil will be received in tank cars on the railroad siding, and each pump is arranged to unload such cars into two of the storage tanks and one of the heating tanks; but the piping is so designed that in case of a breakdown either pump can be connected up so as to take care of the other tanks also. These are rotating plunger pumps.

The steam for the plant is generated in a boiler house of appropriate design and constructed of reinforced concrete and hollow tile, 32 by 36 feet outside dimensions. The boiler is 50 horsepower. Fuel oil is burned under the boiler, being stored in two 10,000-gallon tanks buried under the ground just outside the boiler house, which are filled from cars on the siding by means of a duplex piston pump and are connected up with the necessary burner pumps and steam connections.

All the pipes provided for carrying bituminous material are steam jacketed and provided with the necessary air connections so that they can be blown out after use. They are carried two feet above the ground level and rest on top of the dam walls, thus rendering them easy of access when repairs are necessary. There are also the necessary fuel oil, water, steam, exhaust, air and drain pipes.

On the westerly side of the plant a road has been constructed six feet below the level of the railroad siding. The necessary swing pipes have been provided for the discharge of the heated bituminous material by gravity into tank wagons on this roadway, thus minimizing the amount of pumping required.

All tank foundations and retaining walls are to be made of reinforced concrete.

The plans also call for a concrete and hollow tile cement storage warehouse 25 feet by 40 feet, and 10 feet high, with unloading facilities at the railroad siding and delivery facilities at the road above described.

The Labor Situation

Associated General Contractors of America in convention at New Orleans discuss reduction of wages, open shop, union labor and apprenticeship.

Prominent contractors, associated with many kinds of important construction work throughout the country, discussed wages, unions, open shop and apprentices at the New Orleans convention last month and while differing in details and sometimes in essentials, the preponderance of opinion was in favor of reduction of wages, open shop and education of labor, both mentally and mechanically.

The principal speakers said, in part: W. L. Wimmer, of St. Louis—Recently the general contractors of St. Louis led in the forming of an association between general contractors and subcontractors which includes only those who at present employ nothing but union labor. It has been our custom to make contracts with the labor unions separately for the different trades, and between them and their separate employers' associations. During or just after the first of this year we appointed a committee consisting of one member for each of these sub-contractors' associations and one from the General Contractors' Association, and, together with a similar committee of all the building trades unions, we are trying to hammer out some more definite and harmonious relations.

SHALL WAGES BE REDUCED NOW?

The very first question was, "Is it advisable at this time to have a reduction of wage commensurate with the reduction of costs of all other commodities and all other pursuits of commerce?" To answer it we are now collecting necessary statistics.

T. A. Pearson, of the Fred T. Lee & Co., Inc. —The Building Employers' Association in Boston has made the agreements with the building trades as a whole, not individual agreements, and it was very successful until the first of January, when they expired, and at that time the unions asked for an increase to a dollar and a half an hour for mechanics. In order to combat the increase, the association offered them—after not being able to agree on keeping the wage at $1—ninety cents an hour. We had a strike. The trend of the New England States, I believe, at the present time, is to maintain in force the wage which was in force during the past year until either April or June of this year.

The agreements that we have made in other parts of New England have been at the rate for the past year and will run until the first of April. Any change to be made after the first of April will be discussed during the month of March, when business conditions will be more settled and we will be able to judge in a far better way what business there will be this summer. If it's going to be good, undoubtedly we will revert anyway to the conditions that existed last year and if it's going to be poor, then we can get a reduction.

Mr. A. J. Krebs, of Atlanta—The General Contractors of Atlanta decided, last December, that we would pay the laborers thirty cents an hour, the present wage of the laborers being forty cents; that we'd pay the carpenters seventy cents an hour, their present rate being eighty; the painters, we'd pay seventy cents an hour, their present union rate being a dollar; and the brick masons, ninety cents an hour, their scale then being a dollar and twelve cents, with all the balance they could get.

That was promulgated on the first of January, with the understanding that any contractor who had a job to finish could continue to pay the scale, and the result has been very successful. There were in some instances men who were pulled off the jobs, but the contractors hired other men and went on with their work. Apparently there is no evidence of a strike in Atlanta at all. I believe those wages will stick, if the conditions of the times come out as we expect. There will be a reduction in all kinds of living costs; probably rents are about the only thing that haven't come down and that is on account of the dearth of houses, but altogether that seems to be quite settled and, although the unions are all going to make a fight to hold their present rate of wages in Atlanta, I believe it will stick.

REDUCE TO CORRESPOND WITH LIVING COSTS

E. J. Thomas, of Memphis, Tenn.—The proper way, and the only way it can be reached, where you're going to do collective bargaining, is to go into the scientific analysis of how much living costs have been reduced, and until we arrive at that point where we know, let us take the high peak. If we take the high peak of wages and the high peak of living costs and the living costs have been reduced a certain percentage as a whole, I think the price of labor should come down, because unquestionably labor itself must acknowledge that they were well paid at the peak prices. The question is how to arrive at the proper percentage of reduction.

Unquestionably any man that is a man, and entitled to be in the contracting business, should feel for his men and have interest in their welfare, but we've got to get away from that, the contractor has got to decide what we are going to do relative to this wage question and then use every effort possible, I think, by persuasion and education, with our men, to make them see the light as we see it.

But suppose that we are not going to be able

to make them see it; suppose we show them that living costs by April will be reduced 20 per cent or 25 per cent (which I am sanguine will be the case), and organized labor refuses as a whole, or in their separate communities, to meet a reduction commensurate with the reduction in the cost of living; what are we going to do? What stand are we contractors, representing the industry, going to take? I believe that a 20 per cent or 25 per cent reduction in the high peak of wages is just and right.

It is contrary to the statistics of the Labor Department of the United States, which only, I understand, claim, that living costs so far, as a whole, have been reduced around 6 per cent. I do not take that to be 100 per cent true. I believe that in my own household my living costs have been reduced more than 6 per cent, and in your household your living costs have been reduced more than 6 per cent. I am simply taking that as a general law of average.

Mr. Pearson, of Fred T. Ley & Co.—As a matter of fact out of 116 commodities, living has decreased 38 per cent. It has also increased since 1914 or 1915 143 per cent. Now, which are you going to take for a basis for paying your labor —1914-15 or 1919-20?

I believe the thing that we should do is to find out how much it costs a man to live, whether he is a mechanic or whether he is a laborer, and that is the point that we should begin to base our prices on. We say we are going to wait till the first of April. The first of April things will be settled. We may be able at that time to determine what a living wage is, but until things get settled we cannot do that and I don't believe it is fair to either increase or decrease, just because the low price was in '14 or the high price was in '20.

PUBLIC DEMANDS REDUCED WAGES

Mr. Holladay—You can't get a contract unless the public is ready for that contract. You can't carry a single point, union labor or non-union labor or any principle that you have in your organization, any business principle, unless the public is with you, and the public will defeat you every time you take a stand against the public.

Now, the public all over this country is ready for a reduction in wages. If this association comes out and says that you favor labor coming down, I don't say union labor or non-union labor, but if you favor labor coming down in line with the living expenses, go on record all over this United States; you will have the public behind you. You will have the same situation in your town; I don't care where you come from; but if you sit back and say, "We're afraid to say we want labor to come down," and if you, up in your community, when the question comes up between the labor organization and you, go and sign a contract with them for another year on this present wage basis, the public won't build, they will say, just as they did about clothes, "We won't wear clothes"; or just as it has been said about sugar, "We won't eat sugar." If you want building to start, if you want to increase your profit, if you want to carry your organization, if you want to get through this year without having to pay your overhead, and without having to use up your surplus, block this proposition!

THE OPEN SHOP

Mr. A. J. McKenzie, of San Antonio—We have never signed a contract with a labor union. About a year and a half ago the labor unions imported a number of agitators into San Antonio to close up the town in order to control government contracts. We immediately formed an open-shop association and our main trouble was handling the other contractors rather than handling the labor unions, and as soon as we handled the other contractors, we never had any more trouble with the labor unions.

At the present time we are working probably five hundred men, 60 per cent of whom are union men and 40 per cent non-union, and I haven't had a walking delegate in the office for six months.

Some time ago the Texas Section of the A. G. C. was formed and the reason of its being formed was for the purpose of collecting the data in the various cities and furnishing the rest of the cities with that data with reference to wages. Our union men would go to one city and raise the wages and then go to the next city and tell the people there that wages were higher up in Houston than in San Antonio, and then capture San Antonio and go to Dallas, capture Dallas, and then go to El Paso and raise their wages, and as soon as we formed our organization and furnished each city with the actual facts in the rest of the cities, we soon broke up this situation.

I think the best thing we could do would be to obtain the information with reference to the actual cost of living and furnish it to the various contractors in the various parts of the country. Our position is that the price of labor is a question of supply and demand and we worked on that basis.

We are working the union men one job and the non-union men another place. They don't work together on the same job. We hire a foreman and put him on the job and he hires his own men.

When we formed the open shop, we immediately began working on the man who let the contracts, and we are getting architects, engineers and owners to specify that it's got to be open shop. That's the way we killed the whole proposition. That doesn't mean that we can't work union men, it doesn't mean you can't work union men.

Chairman Bentley—I have on my desk an item clipped from the Tulsa, Okla., Gazette, in which there is a bank advertisement that says that the bank will not loan any money for any building improvement or any public improvement unless the specification and the contract is drawn and guaranteed that that job will be run open shop.

Now, that brings you back to the question, what is an open shop? Is it an organization of mechanics and laborers who do not belong to organized labor? Or is it an amalgamation or a mixture of what we term or what the public terms open shop?

T. T. Flagler, of Atlanta—I think the general trend of the times is towards an open shop. An open shop automatically regulates wages in accordance with the law of supply and demand and I think that if we start making any specific recommendations at this time, we will make a mistake. We are acting on a question which has been pretty thoroughly thought out and before we take any definite action, I wish that everybody here would read the report of the Committee on Labor.

For instance, "What is an open shop?" has been asked. In Mr. Wason's fundamental principle it says, "The right of employer and employee to enter into and determine the conditions of employment relations with each other, without reference to the affiliation or non-affiliation of either with any organization. It is an individual right of free contract possessed by each of the parties."

Now, that has answered the question of the open shop. If you will read these principles, and I think you all have copies, you'll find The Employment Relation, Right of Association, Responsibility of Combinations, Obligation to Secure Production, Wages and Management, Hours of Labor, Adjustment of Employment Relations, Community of Interest, Government Employment and all other matters pertaining to this are thoroughly and splendidly covered in this report.

BUSINESS HEADS MUST GOVERN

The Chairman, Thomas Bentley—Personally, I feel that labor, like everything else, is a matter of competition. I don't believe that the time will ever come in the world when it will be free from labor problems. It would seem to me that the man who is the head of a business employing men who work with their hands has got to be the guiding star of that organization. Whether he sees the light of leading his people individually or collectively, will be a matter of personal judgment.

I think I see in the not very distant future the time when the cessation of work through labor disputes will cease. I believe that organized labor, like anything else, has passed the peak of its power and that the time is not far distant when that body of men, like any other body of men, banded together for personal benefit, will have to begin to see the other fellow's point of view.

To me, as a man who has always been a very, very strong adherent of the open shop, the fundamentals as laid down by the American Federation of Labor, would be one of the grandest things that ever could come into practice, but organized labor, working as it has done, continually upward to its own destruction for the last fifty years, cannot go on and consequently they will have to go back to their fundamentals which are right, and when they get back to those fundamentals, the cessation of work through strikes called for financial reasons, working condition reasons and so forth will cease. It is coercion that has led the average man who belongs to organized labor to participate in the drastic things; he hasn't done it from his own choice.

APPRENTICES

William Ford, of Janesville, Wis.—What are we going to do to replace mechanics; there are no young men entering the trade?

I, for one, am an advocate of fair pay for fair service. We must do something to induce the younger man to follow up the work that we have started. I think that is the apprenticeship question, if you want to call it so, and one that we should think a great deal about and give a great deal of attention to.

Special Mud Excavation Classification

The Iowa Highway Commission has, after strenuous efforts by the contractors, established a new classification to cover the excavation of materials which do not properly belong under the classifications of "ordinary earth" or "loose rock" and are much more difficult and expensive than dry earth to handle. When it is demonstrated that under normal conditions and efficient operations the output is decreased 50 per cent by the wetness of the material, the engineer may make the special classification unit price. The specification is:

Class 2, Special. If in the normal progress of the work material of a nature is encountered which is in natural condition and not in a condition resulting from temperature or weather conditions, and which does not properly come under the classification for Class 1 or Class 2, and is more difficult and expensive to handle than is contemplated for material under Class 3, the engineer may, upon demand of the contractor, give such material a Class 2, Special, classification, under which classification double the price bid for Class 3, Earth Excavation, shall apply. The Engineer shall be guided in giving this classification by the output of the crew employed, under normal and favorable weather conditions; and such a classification shall not be given unless the output of the same crew is decreased by 50 per cent over the average output maintained in material which on the same work is classified properly under Class 3, and unless the contractor uses the ordinary tools, equipment and methods necessary to give the most efficient results.

Public Work to Relieve Unemployment

The city of Waltham, Mass., in February began acting to relieve the unemployment situation by starting grading a steep section of road, cutting down a gravel hill and using the material to raise the road over low land on each side of it. The first morning sixty men applied for work, but only twenty could be used, preference being given to married men, to those who had been in the army and those who were neediest. Six of these failed to show up the second day but others took their places, a number of additional men reporting every morning in hope of work. Later two shifts were worked, one the first three days of the week and the other the last three days. By the end of the month two shifts of fifty men each were at work, and it was said that this might be increased to seventy each, which is about the maximum that can be handled.

Winston-Salem is believed to have done more paving during 1920 than any other southern city with the possible exception of New Orleans. Nine miles, or 175,625 square yards, of various kinds of pavement were laid at a cost of $534,064; this including regrading many streets, lowering water mains, and replacing some with new ones of large size. In addition, the street railway did considerable paving.

Recent Legal Decisions

NO LIABILITY OF CITY FOR INJURY TO GARBAGE DRIVER AS SPECIAL EMPLOYEE AFTER SPECIAL EMPLOYMENT ENDS FOR THE DAY

The driver of a garbage wagon employed by a contractor who contracted with the city of New York for the use of his team with driver at so much a day, the driver reporting to the city's section foreman, who directed him when and where to load his wagon with garbage and ashes, was killed when a wheel came off his wagon after he had unloaded it and was returning to his employer's barn. In a claim against the city under the Workmen's Compensation Act, the New York Appellate Division holds, Backey v. City of New York, 184 N. Y. Supp. 495, that the deceased was not, at the time of the accident, in the employ of the city, his special employer, which could not be held liable, the deceased not having been injured by an accident arising out of and in the course of his employment in removing ashes or garbage, provided for in subdivision 13, section 3 of the act. After the work for the city was done for the day, the deceased reverted to the complete control of his general employer; he was managing and caring for the team, and the accident arose out of and in the course of his employment in driving the team back to the stables of the general employer.

PROVISION IN BOND TO CITY AS TO DILIGENCE IN SERVICE OF PROCESS THEREON MUST BE OBSERVED

The West Virginia Supreme Court of Appeals holds, City of Elkins v. Elkins Electric Ry. Co., 105 S. E. 233, that a provision in a bond given to indemnify a municipal corporation for any damages that may be sustained by reason of the failure of a street railway company to replace city streets injured by it in removing its tracks therefrom, which requires any suit on the bond to be brought before a specified day, and the principal to be made a party thereto, and served with process before that date, if that can be done by the exercise of due diligence, is valid and binding on the parties. The delivery of such process to the sheriff with directions to serve it upon the principal within the time named does not constitute due diligence where the sheriff fails to make the service and it is shown that it could easily have been made within the time provided by the contract.

SUBMISSION OF BOND ISSUE FOR PURCHASE OF UTILITY TO VOTERS

The South Carolina Supreme Court holds, Commissioner of Public Works of Summerville v. Bank, 105 S. E. 32, that in submitting an issue of bonds for public works to the voters of a municipality, where the purposes are entirely separate and distinct, as, for instance, the issuance of bonds for water works and sewerage, the questions must be separately submitted; but separate questions, germane to or involved in one main purpose, need not be separately submitted; for instance, whether bonds shall be issued to purchase, repair and extend an existing system of water works or an electric light plant, because they are so closely related to and involved in the main purpose as to amount to but one question —that of supplying the people with water or with light.

It is also held that the fact that there is an ice manufacturing plant in connection with an electric lighting plant to be so acquired, which is to be included in the purchase as a part of the latter, is no objection to the validity of the bonds. The purchaser of the bonds is not bound to see that the commissioners apply the proceeds to the purposes intended, and no other. He may assume that they will proceed according to law in the performance of their duties.

ILLINOIS CITIES MUST PAY COMPENSATION TO INJURED EMPLOYEES OF UNINSURED CONTRACTORS

The Illinois Supreme Court holds, City of Chicago v. Industrial Commission, 129 N. E. 112, that under section 31 of the Workmen's Compensation Act, requiring employers to pay compensation to their own employees and to the employees of uninsured contractors, a city is liable to an injured driver of a wagon of an uninsured contractor who furnished to the city a team, wagon and driver to haul ashes, etc., for the city under the direction of city officers, although Section 5 of the act provides that a contractor's employee shall not be considered an employee of the city which made the contract.

MUNICIPALITY CANNOT GIVE RAILROAD EXCLUSIVE USE OF A SUBSTANTIAL PART OF A STREET

The Tennessee Supreme Court holds, Stewart v. Illinois Cent. R. Co., 225 S. W. 1042, that, since public highways belong from side to side and from end to end to the public, and abutting owners have special rights of ingress and egress, a municipality cannot grant a railroad company a right of way in a street which would amount to an appropriation of the exclusive use of one-fourth of the street.

NO LIABILITY FOR CONTRACTOR'S NON-PERFORMANCE CAUSED BY DELAY OF STREET RAILWAY COMPANY OR CITY

Streets to be improved were traversed by the tracks of a street railway company, which was required by the ordinance under which the improvement was made to relay its tracks of eight-inch T-rail in place of the five-inch rail then in use. This the company never did, because war prevented obtaining the necessary steel. The improvement contract provided that the contractor should not bear any liability for delays on the part of the street car company. In an action on the contractor's bond it was held, Board of Council of City of Frankfort v. Fidelity & Casualty Co. of New York, Kentucky Court of Appeals, 225 S. W. 1076, that there was no liability on the bond for non-performance of the contract if it was impracticable to build the street until the street car company first put down its eight-inch steel, or if the city authorities interfered to prevent the construction company from proceeding with the work until the steel was laid.

Base and Sub-Base Failures

City and state	Kind of base	Thickness	Wearing surface	Failure due to traffic	Kind of traffic	Failure due to yielding subsoil	Probable cause of yielding
Arizona:							
Douglas	Concrete	4—5	2—1½ in.	No		Yes	Sub-soil dry and loose
Arkansas:							
Pine Bluff	Concrete		Brick and A.C.			Yes	Pipe trench; lack of drainage
California:							
El Centro	Concrete	5	2-in. bitulithic	No		Yes	Swelling sub-soils becoming wet from broken water main or irrigation water
Pasadena	Concrete	4	Asphalt	Yes		Yes	Service ditches and poor maintenance of railway allowed water to penetrate sub-soil
Georgia:							
Augusta	Macadam	6	2-in. A.C.	Yes	Government trucks	No	Poor construction
Illinois:							
Cairo	Concrete	5	Brick	No		No	Trenching for water, gas, sewers
Cicero	Concrete	6	Sheet asphalt and brick	Yes	From 1 to 15 ton vehicles	Yes	Pipe trench and settlement of new embankment
Evanston	Waterbound Macadam	14	Limestone	No		Yes	Marshy sub-soil and lack of sub-drainage
Oak Park	Concrete	6	A.C.	Yes	Heavy truck traffic		
Wilmette	Macadam	6	Brick	Yes	Truck traffic	Yes	
Indiana:							
Crawfordsville	Concrete, gravel	6	Brick	Yes	Too heavy for gravel base	Yes	With concrete base, sewer trench and poor drainage—worst place due to leak in water main
Marion	Crushed stone and gravel	8—10	Brick or sand cushion	Yes		Yes	Lack of drainage
Kansas:							
Salina	Macadam	6	2-in. A.C.	Yes	1-5 ton trucks and autos; 3,000 a day	No	Bad mixture of asphalt and aggregate
Massachusetts:							
Webster	Crushed rock	6	Tar and asphalt	Yes	5,000, 10% heavy auto trucks	Yes	Partly embankment—mostly trucks at high speed
Michigan:							
Saginaw	Concrete	6	4-in. brick 2½-in. asphalt	Yes		Yes	Old trenches show decided settlement
Minnesota:							
Chisholm	Concrete	5	4-in. cresote block	No		Yes	Pipe trenches and settlement of embankment
Mississippi:							
Tupelo	Concrete	4½	Sheet asphalt	Yes	Constant traffic		Expansion
Missouri:							
Brookfield	Loose rock	8	3-in.	Yes	Narrow wheel coal wagons	Yes	Pipe trench—lack of drainage
Maplewood	Concrete	4	Bitulithic	Yes	Heavy trucks—800 a day	Yes	Lack of proper drainage
Poplar Bluff	Clay	6	Dolarnay	Yes		Yes	Lack of drainage
St. Louis	Tilford and concrete	6T 4—5C	Asphalt and bitulithic	Yes			Ground water in clay soil
Nebraska:							
Nebraska City	Concrete	5	2-in. A.C.	Yes	200-300 autos and trucks	No	
New Jersey:							
Orange	Concrete	6	Wood block			Yes	Settlement of pipe trenches
West New York	Concrete	5—7	2-in.—3-in.	Yes	2,000 to 12,000 lbs. 500 to 1,000 vehicles a day.	Yes	Pipe trench
New York:							
Albany	Rolled gravel	10	Brick	No		Yes	Due to high ground-water level and frost going out of ground in spring
Elmira	Concrete	6	Brick	Yes			Pipe trench
Glens Falls	Concrete	6—8	Red brick and Mack block			Yes	Pipe trench and settlement of new embankment
Jamestown	Concrete	5	Brick asphalt block and macadam	Yes	Heavy truck traffic	Yes	Pipe trenches, lack of drainage and unconfined quicksand pockets
Lockport	Concrete	6	Asphalt block	No			Settlement of pipe trenches
Plattsburgh	Concrete	6	Vit. brick	No		Yes	Lack of drainage
Port Chester	Concrete	6	Brick	Yes		Yes	Trenches and traffic and excavation
Syracuse	Concrete	6	Brick	No		Yes	Lack of drainage—possibly quicksand
Utica	Concrete	5				Yes	Pipe trenches and new embankment—excavations
North Dakota:							
Fargo	Concrete	5—7	Asphalt & Port. Cem. Concrete	No		Yes	Lack of drainage and improperly prepared subgrade
Ohio:							
Marysville	Clay, gravel	8	Brick	Yes	Autos and trucks	Yes	
Sidney	Concrete	6	Brick			Yes	Settlement of new embankment
South Point	Macadam	6	Macadam	Yes	225 ¼ ton to 10 ton		
Oklahoma:							
Lawton	Asphalt	6		Yes		Yes	
Pennsylvania:							
Bradford	Gravel and concrete	6	Brick			Yes	Pipe trenches—settlement of embankment
Hanover	Concrete	6	Brick			Yes	Pipe trench
Jersey Shore	Concrete	6	Brick	No		Yes	Pipe trenches—lack of drainage
Philadelphia	Macadam	4—6	Bitulithic	Yes	1,000 to 3,00 vehicles	Yes	Soil and drainage unfavorable
Pittsburgh	Concrete	6	Sheet asphalt	Yes	Truck traffic	Yes	Clay sub-soil
Woodlawn	Concrete	5	Brick block	No		Yes	Settlement of embankment

BASE AND SUB-BASE FAILURES Continued

City and state	Failure: Kind of base	Failure: Thickness	Wearing surface	Failure due to traffic	Kind of traffic	Failure due to yielding subsoil	Probable cause of yielding
South Carolina:							
Spartanburg	Macadam	4	Bitulithic	Yes	1 to 5 ton trucks		Poor foundation
South Dakota:							
Aberdeen	Concrete	6	Wood block	No		Yes	
Texas:							
Amarillo	Vibrolithic	7	Vit. concrete	No		No	Lack of sufficient expansion joints
Bonham	Crushed stone	4	Gravel			No	Not kept in repair
Washington:							
Dayton	A. C.	4	Bitulithic	No		Yes	Pipe trench
W. Virginia:							
Clarksburg	Stone	8	Brick	Yes	5-ton trucks	Yes	Poor drainage
Moundsville	Concrete	4—6	Brick				Installing sewer system
Wisconsin:							
West Allis	Concrete	6	Concrete, asphalt, creosote blocks	Yes	Heavy trucks	Yes	Lack of drainage over pipe trenches
Kansas:							
Emporia	Concrete	4-5	Brick & asphaltic concr.	No		Yes	Yielding of sub-soil and expansion of concrete.
Topeka	Concrete	5	2-in. asphalt	Possibly	Heavy trucks	Possibly	Base failed for some distance beyond ditch lines.
Massachusetts:							
Springfield	Cement concr.	6	Wood blocks	No		Yes	Drainage
New Jersey:							
Bound Brook	Macadam	6	Tar macadam	No		Yes	Pipe trenches—house connections.
Summit	Broken stone	5	Brick	Partly		Doubtful	Poorly constructed; street dug up for repairs to leaky sewer force main.
New York:							
Queens, N.Y.C.	Macadam	6-12	Asphaltic conc.			Yes	Frost
Pennsylvania:							
Butler	Concr. & slag	6c-9s	Brick block			Yes	Pipe trenches and poor drainage.
Greensburg	Slag & stone	6	Vit. paving block	Partly	5-10 ton motor trucks	Partly	Lack of drainage and winter springs.
Williamsport	Concrete	6	Brick	No			Leaky water mains.
Rhode Island:							
Warwick	Gravel	6	Macadam, tar-via treated	No		Yes	Lack of proper drainage.
Texas:							
Houston	Concrete	5-6	Brick, asphalt & wood block	No		Yes	Due to black, waxy soil, which when dry, cracks open; when rain comes cracks are filled causing settlements in some places and heaving in others
Washington:							
Aberdeen	Concrete	4-5-6	Sheet asphalt	..	Up to 7 tons; 500 a day	Partly	Unequal settlement of embankment—insufficient foundation; poor concrete.
Wisconsin:							
Kenosha	Concrete	5	Brick & asphalt	No		No	Sewer trenches—gas and water trenches.
Wyoming:							
Casper	Concrete	4-5	2-in.	No		Yes	Pipe trench

Pavements Laid During 1920

Quantities are square yards or miles unless otherwise indicated.

City and State	Sheet Asphalt	Asphalt Concrete	Tar Concrete	Warrenite-Bitulithic	Bitoslag	Rock Asphalt	Willite	Asphalt Macadam	Tar Macadam
Alabama:									
Florence	.....	.....	.....	78,571.05	.....	.....	.....	.....	.....
California:									
Alameda	.....	.....	.....	.....	.....	.....	.....	1,000	.....
Los Angeles	136,055	5,510	.....	51,721	.....	.....	.....	.....	.....
South Pasadena	.....	.....	.....	.....	.....	.....	.....	25,180	.....
Connecticut:									
Hamden	.....	.....	.....	.....	.....	.....	.....	6,733	.....
Iowa:									
Oskaloosa	.....	3,291	.....	.....	.....	.....	.....	.....	.....
Kansas:									
Topeka	.....	2,400	.....	.....	.....	.....	.....	.....	.....
Kentucky:									
Middlesboro	.....	.....	.....	.....	.....	3,086	.....	.....	.....
Maine:									
South Portland	.....	.....	.....	.....	.....	.....	.....	.....	¼
Massachusetts:									
Greenfield	.....	.....	.....	.....	.....	.....	.....	2,500	.....
Peabody	.....	.....	.....	.....	.....	.....	.....	6,000	.....
Springfield	21,500	.....	.....	.....	.....	.....	.....	42,000	51,600
New Jersey:									
Summit	.....	.....	.....	.....	.....	.....	.....	.....	8,400
New York:									
Queens, N.Y.C.	100,000	250,000	.....	.....	.....	.....	.....	200,000	.....
Poughkeepsie	.....	.....	.....	.....	.....	.....	.....	1,028	.....
Oregon:									
Ashland	.....	.....	.....	9,000	.....	.....	.....	.....	.....

PAVEMENTS LAID DURING 1920 Continued

City and State	Sheet Asphalt	Asphalt Concrete	Tar Concrete	Warrenite-Bitulithic	Bitoslag	Rock Asphalt	Willite	Asphalt Macadam	Tar Macadam
Rhode Island:									
Warwick	.....	.....	.....	.....	.....	.....	.....	.....	1,800
Texas:									
Houston	.....	.....	.....	64,717.40	.....	15,607.50	.....	.....	.....
Wisconsin:									
Kenosha	31,821	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming:									
Casper	.....	.....	.....	115,000	.....	.....	.....	.....	.....

Cities and States	Amiesite	Granite or other Stone Block	Brick or Clay Block	Creosoted Wood Block	Concrete Reinforced	Concrete not Reinforced	Plain (water-bound) Macadam	Gravel	Cement Sidewalks
California:									
Alameda	.....	.....	.....	.....	.....	.....	.....	.....	1,000
Los Angeles	.....	.....	.....	.....	.....	101,775	.....	885,721	1,008,452§
Monrovia	.....	.....	.....	.....	.....	.....	.....	3	½
Ontario	.....	.....	.....	.....	.....	¼	.....	.....	.....
South Pasadena	.....	.....	.....	.....	.....	.....	.....	.....	1,053
Iowa:									
Atlantic	.....	.....	.....	.....	.....	42,000	.....	.....	.....
Kansas:									
Emporia	.....	.....	.....	.....	.....	.....	.....	.....	2,000§
Topeka	.....	.....	1.000	.....	.....	8,000	.....	.....	5,000§
Maine:									
South Portland	.....	3,928.49	.....	.....	.....	.....	½	.....	1,000§ §
Massachusetts:									
Greenfield	.....	.....	.....	.....	3,800	.....	.....	.....	.....
Peabody	.....	614	.....	.....	.....	18,168	.....	30,000	2,600
Springfield	.....	6,600	.....	.....	.....	7,100	.....	.....	4,000
Missouri:									
Boonville	.....	.....	.....	.....	.....	375§ §	.....	.....	.....
Nevada	.....	.....	.....	.....	.....	.....	.....	6½	.....
New Jersey:									
Bound Brook	.....	.....	.....	.....	.....	.....	.....	.....	4,000§
Summit	.....	.....	.....	.....	.....	.....	5,200	.....	.....
New York:									
Queens, N.Y.C.	.....	25,000	.....	.....	.....	.....	25,000	.....	.....
Poughkeepsie	.....	.....	.....	.....	.....	5.570	.....	.....	.....
Ohio:									
Middletown	.....	.....	.....	.....	11.884	.....	.....	.....	.....
Pennsylvania:									
Butler	.....	.....	4,349.9	.....	.....	.....	.....	.....	.....
Somerset	.....	.....	.....	.....	.....	2,000	.....	.....	30,0
Warren	.....	.....	.....	.....	3,000	.....	.....	.....	.....
Rhode Island:									
Warwick	.....	.....	.....	.....	.....	.....	600	10	.....
Texas:									
Houston	.....	.....	.....	.....	.....	.....	62,012.78	.....	.....
Utah:									
Logan	.....	.....	.....	.....	.....	.....	.....	2½	3
Virginia:									
Fredericksburg	.....	.....	.....	.....	.....	.....	.....	35,150	2,200b
Washington:									
Aberdeen	.....	.....	.....	.....	41.700	.....	.....	.....	10,600
Wisconsin:									
Kenosha	.....	.....	23,107	.....	.....	.....	.....	.....	30,870§
Wausau	.....	.....	6,564	.....	.....	27,625	.....	.....	9,000b
Wyoming:									
Casper	.....	.....	.....	.....	.....	10,000	.....	.....	50,000

§—Sq. ft. § §—Ft. b—Lineal feet.

Labor Conditions

City and state	Will there be enough labor for 1921?	Present price	No. of hrs. per day	What will it be next spring?
Alabama:				
Florence	Yes	$3.00	8	$2.00-$2.25
California:				
Alameda	Yes	5.00	8	4.50
Los Angeles	Yes	4.50	8	4.00
Monrovia	Yes	4.00	8	3.00-3.50
Ontario	Yes	3.20	8	3.20
Pomona	Yes	2.50-3.50	8-9	same
So. Pasadena	Yes	3.50	8	same
Connecticut:				
Hamden	Yes	4.00	10	3.50
Illinois:				
Rochelle	Yes	4.00	10	same
Iowa:				
Algona	Yes	6.00	10	5.00
Atlantic	Yes	5.00	10	.40
Glenwood	Yes	.50	..	.40
Monticello	Yes	4.00-5.00	10	....
Oskaloosa	Yes	.45	..	....
Kansas:				
Emporia	....	3.60	8	same
Topeka	Yes	3.20-3.60	8	.40
Kentucky:				
Frankfort	Yes	2.50-3.00	10	same
Madisonville	Yes	3.00	9	2.00-2.50
Middlesboro	Yes	3.00	8	lower
Maine:				
South Portland	Yes	4.00	9	same
Massachusetts:				
Greenfield	Yes	3.20	8	higher
Peabody	Yes	5.20	8	less
Springfield	Yes	4.64	8	less

LABOR CONDITIONS Continued

City and state	Will there be enough labor for 1921?	Present price	No. of hrs. per day	What will it be next spring?
Minnesota:				
Moorhead	Yes	....	..	....
Missouri:				
Boonville	Yes	.25	10	same
Nevada	....	3.50	8	same
New Jersey:				
Bound Brook	Yes	3.60	9	same or less
Summit	Yes	4.50	8	4.00
New York:				
Poughkeepsie	Yes	4.00	8	2.50-3.50
Ohio:				
Middletown	Yes	.35-.40	10	same
Oregon:				
Ashland	....	4.00	8	4.00
Bend	Yes	5.25-5.50	8	4.50-5.00
Pennsylvania:				
Butler	Yes	3.60	9	2.70-3.15
Greensburg	Yes	4.50	9	....
Shippensburg	Yes	.15-.45	10	.30
Somerset	Yes	3.50-4.00	9	3.00
Warren	....	4.00	8	....
Williamsport	Yes	4.00-4.50	10	3.00-3.50
Rhode Island:				
Warwick	Yes	4.50	9	3.15
Texas:				
Houston	Yes	.35-.50	8	same
McKinney	Yes	3.00	8	2.50
Utah:				
Logan	Yes	3.50-4.00	8	same
Virginia:				
Fredericksburg	....	3.00	9	2.50-2.75
Washington:				
Aberdeen	Yes	6.00	8	4.50
Wisconsin:				
Kenosha	Yes	4.00	8	4.00
Wausau	Yes	4.00	8	....
Wyoming:				
Casper	....	6.00	10	5.50

NEWS OF THE SOCIETIES

Apr. 4—OHIO STATE ASSOCIATION, AMERICAN INSTITUTE OF ARCHITECTS, Columbus, Ohio.

Apr. 5-6—SOUTHERN PINE ASSOCIATION. Sixth annual meeting. Grunewald Hotel, New Orleans, La.

April 11 — HARTFORD SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS. City Club, Hartford, Conn.

Apr. 13—ASPHALT ASSOCIATION. New York City.

April 14—SAN FRANCISCO SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

April 15 — MERIDEN SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

April 16—AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Joint meeting with the Association of Iron and Steel Electrical Engineers. Pittsburgh, Pa.

April 18-23 — UNITED STATES GOOD ROADS ASSOCIATION. Greensboro, N. C.

April 21-22—BANKHEAD NATIONAL HIGHWAY ASSOCIATION. 5th annual convention. Greensboro, N. C. Secretary, J. A. Routree, Birmingham, Ala.

April 22 — METROPOLITAN SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Joint meeting with American Institute of Electrical Engineers.

April 22—BIRMINGHAM SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Joint meeting with Atlanta, Birmingham and New Orleans sections, with members of Council present. Battle House, Mobile, Ala.

April 27—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention. Houston, Texas.

Apr. 27-29—BUILDING OFFICIALS CONFERENCE. Cleveland, Ohio.

Apr. 27-29—SOCIETY OF INDUSTRIAL ENGINEERS. Milwaukee, Wis.

April 27-29—UNITED STATES CHAMBER OF COMMERCE. 9th annual meeting. Atlantic City, N. J.

April 27-29 — BUILDING OFFICIAL'S CONFERENCE. Seventh annual meeting. Cleveland, Ohio.

April 28-29—MID-CONTINENT SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Joint meeting of Chemical Eng. Societies. City Auditorium or Convention Hall, Tulsa, Okla.

April 29 — EASTERN NEW YORK SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Edison Club Hall, Schenectady.

April 29 — COLORADO SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Metropole Hotel.

May 2-4—MISSISSIPPI VALLEY ASSOCIATION. 3d annual convention. New Orleans, La.

May 4-7—NATIONAL FOREIGN TRADE CONVENTION. 8th convention. Cleveland, Ohio.

May 9-11—AMERICAN ASSOCIATION OF ENGINEERS. 7th annual convention. Buffalo.

May 9-12—SOUTHWEST WATER WORKS ASSOCIATION. Shirvin Hotel Headquarters, Oklahoma City, Okla.

May 17-19—NATIONAL FIREMEN'S ASSOCIATION. Twenty-third annual convention. Fort Wayne ,Ind.

May 19 — SAN FRANCISCO SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

May 20 — AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. 370th meeting. Engineering Societies Building, New York City.

May 23-26 — AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Spring meeting. Congress Hotel, Chicago.

June—CONFERENCE OF MAYORS AND OTHER CITY OFFICIALS, State of N. Y. 12th Annual Conference. Elmira, N. Y.

June 6-10—AMERICAN WATER WORKS ASSOCIATION. Annual convention at Cleveland, Ohio. Secretary, J. M. Diven, 153 West 71st St., New York.

June 7-9—NATIONAL FIRE PROTECTION ASSOCIATION. Annual meeting. San Francisco, Cal.

June 21-24 — AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Annual and Pacific Coast Convention. Salt Lake City.

AMERICAN ASSOCIATION OF ENGINEERS

The records of the Employment Service Bureau of the American Association of Engineers show that approximately 10 per cent of the engineers in the country are out of employment at the present time. The greatest demand for engineers is in municipal and highway work; there is little demand for railroad engineers, and indications are that no improvement can be expected before August.

The average monthly salary of positions filled during February was $195; total salary of all positions filled was $55,000; saving to members if commercial agencies rendered this service was $33,000.

With a membership of 25,000 engineers of varied qualifications, the American Association of Engineers provides a national agency of engineers for engineers to aid members of the association without cost to them.

BROOKLYN ENGINEERS' CLUB

At the informal meeting March 24, "The Soaring of Birds" was described by Carl Monniche, civil engineer. Mr. Monniche claimed to have discovered how a soaring bird is able to get kinetic as well as potential energy from a horizontal wind with no physical effort, apparently defying all known laws of gravitation. He also explained how, according to his studies, nature has developed soaring birds to facilitate this.

At the informal meeting March 31, Edward P. Atkinson, engineering expert of the Charles A. Schieren Co., presented Industrial Brooklyn Paper No. 5, in which he described and illustrated with moving pictures the process of manufacture of leather belting from the raw hide to the finished product.

THE ENGINEERS' CLUB OF PHILADELPHIA

On March 29 the Engineers' Club held a meeting at which various problems incident to city paving were discussed. The papers presented at this meeting will be published in the Journal of the club.

INDIANAPOLIS CHAPTER, AMERICAN ASSOCIATION OF ENGINEERS

The March 1 meeting of the Indianapolis chapter, A. A. E., for which special invitations were extended to the Scientech Club, the Indianapolis Architects' Association, the Indianapolis Building Contractors and the Indianapolis section, A. W. M. E., was addressed by Lieut.-Col. Boyden, of the Portland Cement Association. His subject was "Recent Developments in Concrete."

The monthly meeting on March 3 was held at the Chamber of Commerce, with Vice-President Ratcliff in the chair. Old resolutions, such as the construction industry, ballot headings, etc., were taken up—and the Indiana Highway Commission and the principles declared by the American Federation of Labor at its recent conference were fully discussed.

INDIANA SANITARY AND WATER SUPPLY ASSOCIATION

The two-day convention of this association, held in Indianapolis on Feb. 16 and 17 was a strictly technical one. The matters of superintendence, extensions and payment for service connections were especially considered. Other subjects discussed were water purification of pollution conditions in the Calumet region, and city planning and its relation to utilities and housing development.

The following officers were elected for the coming year: President, Charles Brossmann; vice-presidents, J. B. Marvin, H. E. Jordan, John C. Davis, George L. Smith and L. Elliott; secretary, C. K. Calvert; assistant secretary, Charles J. Miller.

SAN FRANCISCO SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

The bi-monthly meeting of the San Francisco section of the A. S. C. E., held on February 15, was devoted to a discussion of land improvement work in the central California flood basins. The following papers were read: "Development Under Way and Projected," by Fred H. Tibbetts; "Construction and Operation of World Record Dredges," by F. S. Cooper; and "Installation of Large Drainage Pumps," by Robert Shurman.

AMERICAN RAILWAY ENGINEERING SOCIETY

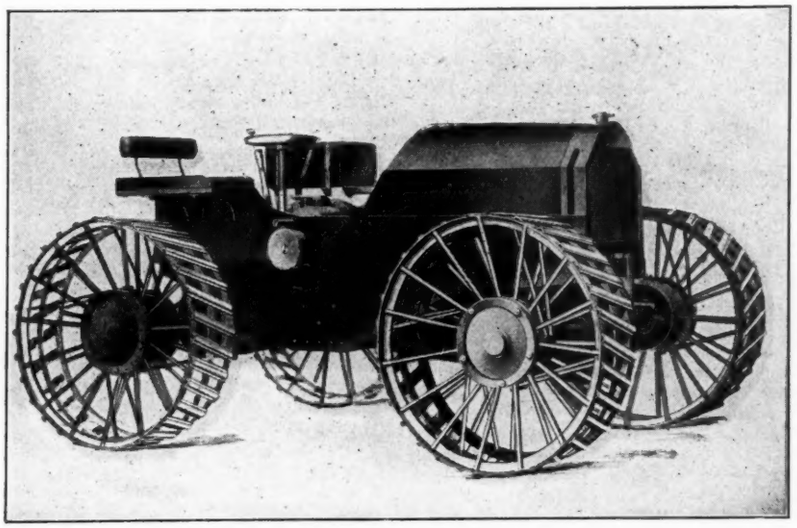
All records for attendance at American Railway Engineering Association meetings were broken on March 15-17, when the annual meeting was held in Chicago. The officers elected at this time for the ensuing year are: President, L. A. Downs; vice-president, E. H. Lee; treasurer, G. H. Bremmer; secretary, E. H. Fritch; and new directors, C. F. W. Felt, G. J. Ray and Col. G. H. Webb. The new nominating committee is as follows: J. R. W. Ambrose, R. H. Ford, E. A. Hadley, J. V. Neubert and A. F. Robinson.

MINNESOTA FEDERATION OF ARCHITECTURAL AND ENGINEERING SOCIETIES

The Minnesota Federation of Architectural and Engineering Societies organized at a meeting in St. Paul on March 11, presided over by Adolph F. Meyer, president of the Minnesota Joint Engineering Board. The federation consists of ten societies and branches of national organizations, which had previously ratified the constitution of the federation. It has no individual members, membership being vested in the various societies, each of which pays dues according to the number of its members.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations



TRACTOR WITH POWER APPLIED DIRECTLY TO ALL FOUR WHEELS

NELSON FOUR-WHEEL DRIVE TRACTOR

The 4-wheel drive tractor manufactured by the Nelson Corporation and sold by the Macbee Company is a powerful, reliable, all-around machine that can be driven through snow, mud or sand, and over large rocks and stumps, across ditches and up steep hills, or over smooth pavements without injuring the latter. It is built in three models, differing only in size, and claims special excellence on account of the application of power to all four wheels, stearing by both front and rear wheels simultaneously honeycomb two-core radiator, unit assembly, three-point suspension and patent link chain drive so flexible that under all conditions the engine power is transmitted to the drive wheels uniformly whether one or all of them are on the ground and whether they are in line or at angles.

The tractors have speed of 1½ to 4 miles per hour and a reverse speed of 2½ miles per hour. The weight is almost equally distributed on both axles, and the draw bar pull shows 75 per cent power efficiency.

PUMP GOVERNOR BULLETIN

Having acquired sole rights to manufacture and sell the "Ideal" pump governor, the Atlas Valve Company is now distributing Bulletin No. 1-A, Edition No. 1, describing it.

The Bulletin shows photographs of finished pump governors, and cross-sectional drawings with all parts numbered, installation and operation are fully explained.

It describes the "Ideal" pump governor for turbine or reciprocating steam-driven pumps; for marine or stationary turbines; fire pumps, lubricating oil pumps, bilge pumps, fuel oil pumps, a pump governor equipped with an emergency control lever for saturated or superheated steam, a governor which automatically shuts down the pump in case of accident to the pump discharge line; a relief valve for oil pumps accepted by the United States Navy for use on Navy vessels suitable for light or heavy oil under high or low pressure; and a high-pressure hydraulic regulating valve suitable for pressures from 500 to 1,000 pounds per square inch. This governor is approved by the National Board of Supervising Inspectors of Steam Vessels, and it is also approved by the Bureau of Engineering, United States Navy Department. Two pages of the bulletin are devoted to special types of Ideal governors for accumulators, for high-pressure fire hydrant service to reduce the main pressure to a safe carrying hose pressure, for hydraulic pumping rams, and for pumps for low-pressure salt or fresh water, acids, oils, ammonia, gas or air-line service.

THE AUTO-SWEEPER

The Auto-sweeper is described in circular 44 published by the Elgin Sales Corporation, which recommends motor sweepers for efficiency and for the relief of street congestion by virtue of its operation with the least possible interference with traffic. The machine occupies a 65 x 164-inch space and has an 8-foot broom. It is mounted on three wheels so as to turn in narrow streets without backing. The parts of the machine are made adjustable and it is provided with an air compressor and valve regulation to adjust the quantity and pressure of water for sprinkling, which can be reduced to 180 gallons per hour under the best conditions. The water can be regulated from a fine mist to a heavy spray and is strained at the sprinkler nozzles, which can be cleaned in 15 seconds. The machine is provided with an extra broom to be used while the fibre in the other is being replaced. The broom can be set at a right or a left angle, is adjustable, and is suspended from springs.

The engine is of 35 h. p. with a 5-inch stroke and consumes from 6 to 8 gallons of gasoline and 2 quarts of oil daily. The machine has three speeds forward and one reverse, and can be operated at a speed of 8 miles per hour, thus covering 262,826 square yards of pavement in 8 hours.

GRUENDLER STONE CRUSHER

The Gruendler Patent Crusher and Pulverizer Company has put on the market the Gruendler good road builder which is a complete plant comprising a crusher, elevator, screen and bin which, although mounted on portable trucks for its transfer along the highway, is as strong as any stationary outfit, and can be separated into independent crusher and elevator installations.

The crusher has a fixed and a movable jaw set with an adjustable distance between them governed by toggle plates and wedges of several sizes to regulate the size of the crushed stone. The portable machine is built in 7 x 10, 8 x 12, 9 x 14, 10 x 16 and 12 x 20-inch sizes, with or without a folding elevator and a gasoline or kerosene engine. The approximate weight varies from 2,500

35 H.P. MOTOR SWEEPER WITH CAPACITY FOR MORE THAN 262,000 SQUARE YARDS IN 8 HOURS

Engineering Library

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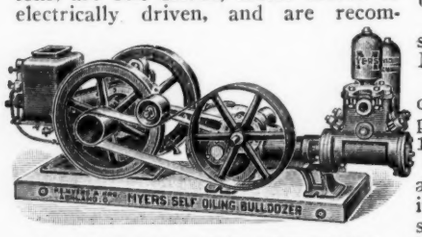
pounds to 11,000 pounds and the capacity runs from about 1 ton to 20 tons per hour of ¼-inch to 3-inch products. The company also manufactures cylindrical and conical revolving and shaker screens and a special friction clutch pulley for use when the crusher is driven by a gasoline tractor or engine which can be freely started before engaging the crusher.

SELF-OILING BULLDOZER POWER PUMPS

The self-oiling Bulldozer power pumps manufactured by F. E. Myers & Brother are made in seven sizes with capacities from 500 gallons to 4,500 gallons, are belt driven, motor driven or electrically driven, and are recommended for general contractors' purposes, for road building and for other portable power work.



SELF-OILING PUMP FOR HIGHWAY CONSTRUCTION

They will deliver water at a distance of 2½ miles against an elevation of 450 feet. They are self-oiling with all working parts fully enclosed and can operate at high speed with minimum attention.

PERSONALS

Hogg, W. T., formerly with the engineering department of the Dock Board at New Orleans, La., has been appointed chief draftsman.

Wilson, Capt. W. J., has been appointed assistant chief engineer in the engineering department, Port Commission, Seattle, Wash., and George F. Nicholson is chief engineer.

Murdock, Alexander, chief adjuster, U. S. Emergency Fleet Corporation, has been appointed city engineer of Chicago.

Sneary, Roy E., formerly assistant engineer of Davenport, Ia., has been appointed city engineer of East Moline, Ill.

Shea, William J., formerly Major of Engineers, U. S. A., has been appointed construction engineer, Department of Public Works, Bureau of Highways, Brooklyn, N. Y.

Greene, Col. Frederick Stuart, formerly New York State Highway Commissioner, has opened an office in New York City as consulting engineer on highway construction and department organization, waterproofing, pier, dock and concrete construction.

F. F. Censky has been promoted to assistant advertising manager of the Traffic Motor Truck Corporation, St. Louis.

Waugh, Richard D., formerly chairman of the Greater Winnipeg Water Board, was reappointed by the executive council of the League of Nations as Canadian member of the Saar Valley Governing Commission.

Washington, Walter, has been appointed city manager of Charlottesville, Va., to succeed Shelton S. Fife.

Dugan, F. C., formerly design engineer, sewerage division, Flint, Mich., has been appointed state sanitary engineer of Kentucky, with headquarters at Louisville.

McKenzie, Major-Gen. Alexander, U. S. A., retired, died on February 23, at Washington, D. C.

McDonough, Col. Michael J., Corps of Engineers, U. S. Army, died in Denver, Colo., on February 13.

Inman, C. E., now manager of the municipal plant of Paterson, N. J., will be manager of the water department of Warren, Ohio, after April 1.

Anderson, Carl, has been appointed superintendent of the water works of Mitchell, S. D.

Comant, Nelson Whitney, secretary of the Jersey City N. J., Water Supply Co., died in New York on March 1, at the age of seventy-two years.

Wolf, Herman C., formerly assistant engineer of the Illinois Public Utility Commission, has been appointed assistant chief engineer of the Public Service Commission of Maryland.

Fitch, Squire E., has been appointed a division engineer of the New York State Highway Department.

Kintz, M. L., has been appointed city building commissioner of Canton, Ohio.

Dugan, F. C., formerly designing engineer of the sewerage division office of the city engineer, Flint, Mich., has been appointed state sanitary engineer of Kentucky with headquarters in Louisville, Ky.

Cranch, Eugene T., has been appointed city sanitary engineer of Petersburg, Va.

Ripley, Theron M., is now division engineer of the New York State Highway Department and will have charge of the division office at Hornell, N. Y., and Perry Filkin, formerly division engineer there, has been transferred to the Buffalo division.

Lederle, Ernst J., chemist and twice commissioner of health of New York City, died on March 7.

INDUSTRIAL NOTES

A new branch of the Blaw-Knox organization, to be known as the development department, has been created with O. D. McArthur, formerly assistant general sales manager, in charge. Mr. McArthur will direct the development of new products, both for manufacture and sale.

N. B. Payne & Co., of New York, dealers in electric cranes and hoists, are now handling machinery to include the portable conveyors of the A. C. Warner Co., Philadelphia, Chicago automatic coal elevators and McKinney-Harring ton package pilers and car loaders.

The Chippewa Pump Co., Chippewa Falls, Wis., has opened an office at 201 East Ontario street, Chicago, Ill., with J. C. Huffman as district manager.

The Western Tool & Manufacturing Co., of Springfield, Ohio, has established an office at 25 Park place, New York City.

The Adamson Manufacturing Company, East Palestine, Ohio, has added a new department for manufacturing all kinds of storage, pneumatic and pressure tanks, welded pipe, battery casings, evaporators, condensers, etc.

The National Steel Fabric Co. of Pittsburgh, Pa., has opened an office in the Mutual building, Kansas City, Mo., in charge of H. H. Robinson.

The Equitable Equipment Co. has taken over the equipment, rail and machinery business of A. Marx & Sons, the Southern Scrap Material Co. and the Ship Supply Co. and will handle this under its new organization which is to be managed by Mr. Cleveland, formerly manager of the New Orleans branch of the General Equipment Co. The office will be at 411 Whitney-Central building, New Orleans, La.

BIG ROOFING CONCERN CHANGES ITS NAME

The Standard Paint Company, manufacturers of Ruberoid Roofing for nearly forty years, will be known, after April 1, 1921, as The Ruberoid Co.

This change of name will in no way affect the products nor the personnel of this concern. The offices and plants of The Ruberoid Co. will be the ones now operated by The Standard Paint Company.

AUSTIN MACHINERY CORPORATION

The extensive fire in the Winthrop Harbor, Ill., plant of the Austin Machinery Corporation on Tuesday night, March 22, will not in any way interfere with production and prompt delivery of Austin trenching machines, backfillers, building mixers, pavers, draglines and shovels, as practically all lines of Austin machinery are also being built at the plants at Muskegon, Mich., as well as at the former plant of the Toledo Bridge & Crane Co., at Toledo, Ohio.

The fire at the Winthrop Harbor plant completely destroyed the "unfinished stock" warehouses and store rooms; both the trenching machinery assembly and paving mixer assembly buildings, and a number of machines on which assembly was practically completed; but the fire did not reach the "finished machines" warehouses.

The Austin Machinery Corporation has on hand in Muskegon and at Toledo ample stocks of wagon loaders, the popular sizes of trenching machines, backfillers, mixers, pavers and ½-yard and ¾-yard draglines and shovels and a new lot of 1-yard shovels and draglines are now coming through the Toledo plant.

NEW BLAW-KNOX OFFICE

The Blaw-Knox Company, of Blawnox, Pittsburgh, will, on April 1, open a new sales territory in the Southwest, with headquarters in Kansas City, Mo. In addition, the Blaw-Knox Company has sales offices in New York, Chicago, Detroit, Boston, Baltimore, San Francisco and Sheffield, Eng.

The Kansas City office is in charge of R. B. Randall, who will be known as manager of the Southwestern territory.